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28 September 2000

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The Assistant Commissioner of Patents
Washington, D.C. 20231

Attorney Docket No.: P56173

Sir:

Submitted herewith is the following patent application:

Inventor: **YOUNG-HUN CHOI, JONG-HWA SHIN**

Title: **FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF**

Please find attached hereto an application for patent which includes: Specification and Abstract, Claims, and a certified copy of the foreign priority document identified below:

Verified Showing of Small Entity Status: NO

Drawings: Formal drawings, 8 sheets, Figures 1 through 9

Claim of priority under 35 U.S.C. §119: **YES**

REPUBLIC OF KOREA Application No. 99-49230 filed in Korea on 8 November 1999

Fee (see formula below): **CHECK IS ENCLOSED**

Basic Fee $345/690	$690.00
Additional Fees:	
Total number of claims in excess of 20: 0 times $9/18	$0.00
Number of independent claims in excess of 3: 1 times $39/78	$78.00
Multiple dependent claims $130/260	$0.00
An Assignment is likewise enclosed: Recording Fee $40	$40.00
Filing Non-English specification	$0.00
TOTAL FEES FOR THE ABOVE APPLICATION	**$ 808.00**

Inventor: **YOUNG-HUN CHOI, JONG-HWA SHIN**

Title: **FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF**

Should the enclosed check become lost or detached from the file, the Commissioner is authorized to charge for any additional charges incurred, or credit any excess payment to the Deposit Account No. 02-4943. Kindly notify the undersigned attorney of any transaction regarding our Deposit Account.

In view of the above, it is requested that this application be accorded a filing date pursuant to 37 CFR 1.53(b).

Please address all corresponding to :

Robert E. Bushnell
1522 K Street, N.W., Suite 300
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Respectfully submitted,

Robert E. Bushnell
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Folio: P56173
Date: 9/28/00
I.D.: REB/sys

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FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1
These are the fees effective October 1, 1997
Small Entity payments must be supported by a small entity statement
otherwise large entity fees must be paid *See* Forms PTO/SB/09-12
See 37 C F R §§1 27 and 1 28

Complete If Known	
Application Number	*to be assigned*
Filing Date	28 September 2000
First Named Inventor	YOUNG-HUN CHOI
Examiner Name	*to be assigned*
Group/Art Unit	*to be assigned*
Attorney Docket No.	P56173

TOTAL AMOUNT OF PAYMENT	($) 808.00

METHOD OF PAYMENT (check one)

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any over payments to

Deposit Account Number: 02-4943
Deposit Account Number: _____

☐ Charge Any Additional Fee Required Under 37 C F R §1 16 and 1 17 ☐ Charge the Issue Fee Set in 37 C F R §1 18 at the Mailing of the Notice of Allowance

2. ■ **Payment Enclosed(CK#37439 & #37440)**
■ Check ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	690	201	345	Utility filing fee	$ 690 00
106	310	206	155	Design filing fee	$
107	480	207	240	Plant filing fee	$
108	690	208	345	Reissue filing fee	$
114	150	214	75	Provisional filing fee	$

SUBTOTAL (1) ($) 690.00

2. EXTRA CLAIM FEES

			Extra Claims		Fee from below		Fee Paid
Total claims	19	-20** =	0	x	18	=	0
Independent Claims	4	- 3** =	1	x	78	=	78
Multiple Dependent						=	

** *or number previously paid, if greater, For Reissues, see below*

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	18	203	9	**Claims in excess of 20**
102	78	202	39	**Independent claims in excess of 3**
104	260	204	130	**Multiple dependent claim, if not paid**
109	78	209	39	** **Reissue independent claims over original patent**
110	18	210	9	** **Reissue claims in excess of 20 and over original patent**

SUBTOTAL (2) ($) 78.00

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge-late filing fee or oath	$
127	50	227	25	Surcharge-late provisional filing fee or cover sheet	$
139	130	139	130	Non-English specification	$
147	2,520	147	2,520	For filing a request for reexamination	$
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	$
113	1,840 *	113	1,840*	Requesting publication of SIR after Examiner action	$
115	110	215	55	Extension for reply within first month	$
116	380	216	190	Extension for reply within second month	$
117	870	217	435	Extension for reply within third month	$
118	1,360	218	680	Extension for reply within fourth month	$
128	1,850	228	925	Extension for reply within fifth month	$
119	300	219	150	Notice of Appeal	$
120	300	220	150	Filing a brief in support of an appeal	$
121	260	221	130	Request for oral hearing	$
138	1,510	138	1,510	Petition to institute a public use proceeding	$
140	110	240	55	Petition to revive - unavoidable	$
141	1,210	241	605	Petition to revive - unintentional	$
142	1,210	242	605	Utility issue fee (or reissue)	$
143	430	243	215	Design issue fee	$
144	580	244	290	Plant issue fee	$
122	130	122	130	Petitions to the Commissioner	$
123	50	123	50	Petitions related to provisional applications	$
126	240	126	240	Submission of Information Disclosure Statement	$
581	40	581	40	Recording each patent assignment per property (Times number of properties)	$ 40 00
146	690	246	345	Filing a submission after final rejection (37 C F R §1 129(a))	$
149	690	249	345	For each additional invention to be examined (37 C F R §1 129(b))	$

Other Fee (specify)_____ $

Other Fee (specify)_____ $

** Reduced by Basic Filing Fee Paid **SUBTOTAL (3)** **$40.00**

SUBMITTED BY

Typed or Printed Name	Robert E. Bushnell, Esq.			Reg. Number	27,774
Signature	Robert E. Bushnell	Date	28 September 2000	Deposit Account User ID	

REB/sys

PATENT
P56173

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

YOUNG-HUN CHOI *et al.*

Serial No.:	*To Be Assigned*	Examiner:	*To Be Assigned*
Filed:	28 September 2000	Art Unit:	*To Be Assigned*

For: FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF

CLAIM OF PRIORITY
UNDER 35 U.S.C. §119

The Assistant Commissioner
of Patents
Washington, D.C. 20231

Sir:

The benefit of the filing date of the following prior foreign application, Korean Priority No. 99-49230 filed in Korea on 8 November 1999, and filed in the U.S. Patent and Trademark Office on 28 September 2000 is hereby requested and the right of priority provided in 35 U.S.C. §119 is hereby claimed.

In support of this claim, filed herewith is a certified copy of said original foreign application.

Respectfully submitted,

Robert E. Bushnell
Reg. No.: 27,774
Attorney for the Applicant

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Folio: P56173
Date: 9/28/00
I.D.: REB/sys

TITLE OF THE INVENTION

FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF

CLAIM OF PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C §119 from an application entitled *Display System Possible Of Fingerprint Recognition And Operating Method Thereof* earlier filed in the Korean Industrial Property Office on 8 November 1999, and there duly assigned Serial No. 99-49230 by that Office.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to a display system, more particularly, to a fingerprint recognizing display system including fingerprint recognizing means in a panel of a display apparatus and an operating method thereof, wherein a fingerprint of an user is read and a program supported by a computer is allowed to be operated only if the read fingerprint is registered in a fingerprint data base of the computer.

Description of the Prior Art

As the environment related to the Internet and the personal computer (PC) rapidly changes,

there is an increasing problem that a hacker, *i.e.*, an unauthorized user, can gain access to files, personal or company information on the computer which in turn can be damaged, downloaded or deleted. Additionally all the information in a computer can disappear because of a virus. Accordingly, it becomes necessary to be able to increase the security of the computer or other hosts, such as a terminal unit, network or network-based system to prevent the above problems.

To resolve the above problems, a computer connected to a network includes features such as required password access in order to protect the information therein. However, sometimes a password is chosen as a word easily guessed or a common word easily searched by a search program using dictionary data base. Therefore, an unauthorized user can discover the password and gain access to the data on the computer.

To resolve the problem regarding password protection, a fingerprint recognizing module has been applied to a computer system, wherein a fingerprint data base is established after obtaining the fingerprint of authorized users. Thus, when one desires to gain access to the data on the computer system, or operate a program therein, their fingerprint is compared to the data in the fingerprint data base before they are permitted to use the computer.

For example, such systems were disclosed in U.S. Patent No. 5,838,306 to Clint O'Conner et al. and entitled *Mouse With Security Feature* and U.S. Patent No. 5,420,936 to Greg P. Fitzpatrick et al. and entitled *Method And Apparatus For Accessing Touch Screen Desktop Objects Via Fingerprint Recognition.*

The invention disclosed in U.S. Patent No. 5,420,936 provides touch-sensitive fields on a computer display for user selection. Upon selecting one of the fields with a fingertip, a fingerprint

therefrom is analyzed and compared to a list of authorized fingerprints. Once the fingerprint passes inspection, the user is granted access to the underlying program. It is difficult, however, to apply this invention to a general monitor since a touch screen is required.

The invention disclosed in U.S. patent No. 5,838,306 utilizes a computer mouse as an input peripheral device which includes a window area integrally constructed within the mouse and positioned at an area on the mouse upon which a user normally places a finger in operating the mouse. The mouse further includes an illuminating device and a light sensitive detection device for providing a user signature signal representative of the characteristics of the ridge and valley pattern of the fingerprint of a finger placed upon the window area. The signature signal is transmitted to a BIOS within the computer system in which the mouse is operating and compared with one or more stored patterns which have previously been authorized for access to the computer system. When the user's signature signal is compared with and matches one of the stored and approved signature signals, the system is enabled and the user is granted access. However, if a fingerprint recognizing module is included into a mouse, it is inconvenient to use the mouse because the weight and size of the mouse are increased.

Also, users often pick up the mouse to move it and in so doing they may drop the it. Thus, a fingerprint recognizing module or a fingerprint recognizing unit within the mouse may be damaged due to the shock caused by its being dropped, and a user's fingerprint may not be correctly recognized. In addition, some computer systems may not need a mouse, but in order to incorporate the fingerprint recognition disclosed in the 5,838,306 patent, one must buy the mouse having the features disclosed therein. Also, a fingerprint recognizing module is automatically changed at the

time of changing a mouse according to the prior art, and the user is charged an unreasonable cost.

SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to provide a fingerprint recognizing display system including fingerprint recognizing module into a panel of a display apparatus and an operating method thereof, wherein an user's fingerprint data is read, the read fingerprint data is transmitted to a computer main body by using a communication unit included in a fingerprint recognizing module of a display apparatus, and a program supported by the computer main body will be operated only if the fingerprint data transmitted from the display apparatus is included in the fingerprint data registered into the computer main body.

Another object of the present invention is to provide a fingerprint recognizing display system and an operating method thereof, wherein a panel of a display apparatus includes fingerprint recognizing module, the fingerprint recognizing module reads fingerprint data of the user, the read fingerprint data is transmitted to a computer main body by using its own communication protocol of the display apparatus, and a program supported from the computer can be operated only if the transmitted fingerprint data is registered in the computer main body.

To achieve the above objects, an apparatus according to the present invention comprises a display apparatus including a fingerprint recognizing module, recognizing a fingerprint of an user through the fingerprint recognizing module and outputting the recognized fingerprint data by using communication unit included in the fingerprint recognizing module, and a computer main body including a fingerprint data base having more than one fingerprint data and a fingerprint verifying

unit, and operating a program after deciding whether fingerprint data input from the display apparatus is an approved fingerprint through the fingerprint data base and the fingerprint verifying unit.

Additionally, in a display system wherein a microprocessor of a display apparatus according to the present invention receives a video signal and a control signal from a video card of a computer main body in accordance with a communication protocol and outputs a video signal on a screen, the display apparatus includes a fingerprint recognizing module and recognizes the user's fingerprint through the fingerprint recognizing module, and the recognized fingerprint data is output to the microprocess through a communication protocol and to the computer main body in accordance with a communication protocol equipped between the display apparatus and the computer main body, and the computer main body comprises a fingerprint data base including more than one fingerprint and a fingerprint verifying unit, receives the fingerprint data input from the display apparatus through the communication protocol input to the video card and operates a program after deciding whether the input fingerprint is an approved fingerprint by the fingerprint data base and the fingerprint verifying unit, and then a program is operated.

Also, the display apparatus according to the present invention comprise further a front cover and fingerprint recognizing module placed in a side or front panel of the front cover.

Further, the display apparatus according to the present invention is characterized by integrating the fingerprint recognizing module to a power switch.

Further yet, a system operating method according to the present invention is characterized by including fingerprint data base in a computer main body and by driving the system only if

fingerprint data transmitted to communication unit of the computer main body through the communication unit of a fingerprint recognizing module included in a display apparatus is registered in the fingerprint data base.

Yet further, a system operating method according to the present invention is characterized by including fingerprint data base in the computer main body and by driving the system only if fingerprint data transmitted to communication unit of the computer main body through its own communication protocol of a display apparatus is registered in the fingerprint data base.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention, and many of the attendant advantages thereof, will become readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

Fig. 1 is a perspective view illustrating a general monitor.

Fig. 2 is a view illustrating an embodiment according to the present invention.

Fig. 3 is a view illustrating another embodiment according to the present invention.

Fig. 4 is a perspective view illustrating a cathode ray tube (CRT) display unit to which a fingerprint recognizing part shown in Fig. 2 or Fig. 3 is applied.

Fig. 5 is a perspective view illustrating a display apparatus for a liquid crystal display (LCD) to which a fingerprint recognizing part shown in Fig. 2 or Fig. 3 is applied.

Fig. 6 is a flowchart illustrating steps according to the present invention applied to an operating system's (O/S) kernel mode.

Fig. 7 is a flowchart illustrating a management and a registration of fingerprint data applied to the present invention.

Fig. 8 is a flowchart illustrating steps according to the present invention applied to a screen protecting mode.

Fig. 9 is a flowchart illustrating a routine encoding/decoding a file by using the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

Hereinafter, a preferred embodiment of the present invention will be described in details with reference to the accompanying drawings. The term "display system" used in the present invention means a total system including a display apparatus 100 and a computer main body 200.

Fig. 1 is a perspective view illustrating a general monitor M. Fig. 2 is a view illustrating an embodiment of the present invention. As shown in Fig. 2, a display system comprises a display apparatus 100 including a fingerprint recognizing module 110, recognizing an user's fingerprint through the fingerprint recognizing module 110 and outputting the recognized fingerprint data through a first communication unit 113 included in fingerprint recognizing module 110, and a computer main body 200 including a fingerprint data base 210 and fingerprint verifying unit 220, receiving fingerprint data output from display apparatus 100 through a second communication unit 240, deciding whether the input fingerprint data is an approved fingerprint data through fingerprint

data base 210 and fingerprint verifying unit 220, and driving a program only if the input fingerprint data is approved.

Fingerprint recognizing module 110 in display apparatus 100 comprises a fingerprint image recognizing unit 111 providing a fingerprint sign of an user representing the user's fingerprint, a converter 112 converting analog fingerprint data input from the fingerprint image recognizing unit 111 to digital fingerprint data, and communication unit 113 outputting the digital fingerprint data to communication unit 240 in computer main body 200.

Fingerprint image recognizing unit 111 can be embodied by an optical sensing method using a prism or hologram sensing method and a non-optical sensing method using a sensor array, ultrasonic or magnetic sensing method.

The display apparatus 100 also comprises a memory 130, an image signal processing unit 140 and a microprocessor 120.

Fingerprint verifying unit 220 in computer main body 200 comprises a distinctive feature detecting unit 221 detecting a distinctive feature of the fingerprint data input by communication unit 240, a fingerprint matching/recording unit 222 decoding the encoded fingerprint data stored in the fingerprint data base 210 through a decoding unit 224, comparing the decoded fingerprint data with the fingerprint data input from distinctive feature detecting unit 221 and storing new fingerprint data into fingerprint data base 210 after encoding the same through an encoding unit 225 if any new fingerprint data is input through communication unit 240, and a recognizing unit 223 outputting a "pass" signal or a "fail" signal by using the result input from fingerprint matching/recording unit 222.

Computer main body 200 further comprises a video card 230, a central processing unit (CPU)

250, a memory 260, and a ROM 270.

Fig. 3 is a view showing another embodiment according to the present invention. As shown in Fig. 3, a display system comprises a display apparatus 100a which includes a fingerprint recognizing module 110a, recognizing the user's fingerprint through the fingerprint recognizing module 110a, receiving the recognized fingerprint data into microprocessor 120 and outputting the same to a computer main body 200 through its own communication protocol, wherein the computer main body 200, including fingerprint data base 210 and fingerprint verifying unit 220, receives the fingerprint data input from display apparatus 100 through a communication protocol input to video card 230 and drives a program only if the received fingerprint is approved by fingerprint data base 210 and fingerprint verifying unit 220.

Fingerprint recognizing module 110a comprises fingerprint image recognizing unit 111 providing a fingerprint sign of the user representing the user's fingerprint and converter 112 converting analog fingerprint data input from the fingerprint image recognizing unit 111 to digital fingerprint data and outputting the latter to microprocessor 120 included in display apparatus 100.

The fingerprint image recognizing unit 111 shown in Figs. 2 and 3 can be applied to a CRT display apparatus or a display apparatus for a LCD as shown in Figs. 4 and 5. In other words, the fingerprint image recognizing unit 111 reading the user's fingerprint is installed in a front cover 300 of a LCD or CRT display apparatus and a front or side panel of the front cover 300.

Additionally, the fingerprint image recognizing unit 111 is formed integrally at a power switch 111a and a power on/off signal of a display unit is output if the power switch 111a is deeply pressed. Generally, the power switch 111a is used as the fingerprint image recognizing unit 111 and

reads the user's fingerprint if the user touches the power switch.

The other compositions of the display apparatus 100 and the computer main body 200 are not different from the above embodiment and will not be described in details.

An operation of the display system recognizing a fingerprint according to the present invention will be described with reference to the flowcharts shown in Figs. 6 - 9.

Fig. 6 is a flowchart illustrating steps according to the present invention applied to an O/S kernel mode. When the user turns on the power of a display apparatus 100 and a computer main body 200, the computer main body 200 decides whether a fingerprint data base 210 is established (S500).

If the fingerprint data base 210 is not established, the computer main body 200 recognizes a display system as being activated, controls the total system to maintain the display system in an active state (S505). Thereafter, a fingerprint registration step (S510) is enabled and fingerprint data is registered (stored) in fingerprint data base 210.

When it is determined in step S500 that fingerprint data base 210 is established in the computer main body 200, the computer main body 200 decides whether a monitor, *i.e.*, CRT or LCD, connected to the computer main body 200 is a fingerprint recognizing monitor (S515).

When it is determined in step S515 that the monitor is not a fingerprint recognizing monitor 100, the computer main body 200 recognizes (S520) the monitor as having an abnormal status and the total system is not operated (S520).

When it is determined in step S515 that the monitor is a fingerprint recognizing monitor, the fingerprint recognizing unit 111 reads a fingerprint of a user and decides whether the fingerprint

image is normally received (S530). When it is determined that a fingerprint image is normally received, the normally received fingerprint image is converted to digital fingerprint data and transmitted to the computer main body 200 (S535). At this time, when the apparatus shown in Fig. 2 is used, the fingerprint data is transmitted to communication unit 240 in the computer main body 200 through communication unit 113 included in a fingerprint recognizing module 110. On the other hand, when the embodiment shown in Fig. 3 is used, the fingerprint data is output to microprocessor 120 in display unit 100 by using I^2C ((IIC) Inter-IC bus), DDC (Display Data Channel) or USB (Universal Serial Bus) communication protocol. Then, microprocessor 120 outputs the fingerprint data to video card 230 by using its own communication protocol and communication unit 240 in the computer main body 200 receives the fingerprint data from a communication line of video card 230. When it is determined that a fingerprint image is not normally received, the process returns to step S525, and the user's fingerprint is again received.

The fingerprint data received by communication unit 240 is input to a distinctive feature detecting unit 221 and its distinctive feature is detected (S540). The quality of the detected fingerprint data (namely, rate of recognition) is measured (S545). If thequality is so poor that the detected fingerprint data can not be compared with the registered fingerprint data in the fingerprint data base 210, an error massage is output (S550), the process returns to the step S525, and the user's fingerprint is again received.

If the quality of the detected fingerprint data is good, the detected fingerprint data is compared with the registered fingerprint data in the fingerprint data base 210, and it is decided whether there is the identical fingerprint in the data base (S555 and S560).

If there is no identical fingerprint data in the registered fingerprint data base, the display system is recognized as having an impossible to use status and the system cannot be operated (S565). If there is an identical fingerprint data in the registered fingerprint data base, the available value of the recognized fingerprint is measured (S570).

It is then decided whether the measured available value of the fingerprint is included in a predetermined range (S575). If the measured available value of fingerprint is included in the predetermined range, the system is recognized as having an enabled for use status (S580) and the system can be operated by the user. If the measured available value of fingerprint is not included in the predetermined range, it is decided whether the user has attempted to input a fingerprint a number of times which exceeds a predetermined number of times (S585). That is, the user can attempt to input the fingerprint a predetermined number of times, and if the number of times of inputting a fingerprint exceeds a predetermined number of times, the system is recognized as having an impossible to use status and the system cannot be operated (S590). If it is determined that the number of times of inputting a fingerprint is not in excess of a predetermined number of times, a fingerprint re-input message is output (S595) and the process is returned to the step S515.

Fig. 7 is a flowchart illustrating management and registration of fingerprint data applied to the present invention. As shown in Fig. 7, steps S615 to S655 are the same steps as steps S515 to S555 shown in Fig. 5, and will not be described in detail.

In the step S655, the read fingerprint data of an user is compared with the registered fingerprint data in the fingerprint data base 210 and it is decided whether the read fingerprint is a fingerprint of an authorized manager (S660). If it is a fingerprint of an authorized manager, the

authorized manager is passed (S670) and the total system is controlled to operate a fingerprint managing and registering program (S675). If it is not a fingerprint of an authorized manager, the total system is controlled not to be operated since the system recognizes it as a non-authorized manager (S665).

Fig. 8 is a flowchart illustrating a case applying the present invention to a screen protecting mode (known in the art) during which a screen is blank or a screen saver program is running. As shown in Fig. 8, it is decided whether a keyboard or a mouse is moved (S700). If the keyboard or the mouse is not moved, a screen protecting mode continues to operate (S705). If the keyboard or the mouse is moved, the routine proceeds with the step S710 to the step S750 which are the same steps as step S515 to step S555of Fig. 5 and thus will not be described in detail.

Once the user's fingerprint data is read and compared with the registered fingerprint data in the fingerprint data base 210 in the steps S720-S750, it is decided whether it is a fingerprint of a registered user (S755). If the read fingerprint is a fingerprint of a registered user, the user is passed (S765) and the screen protecting mode is dissolved and the total system is controlled to be operated (S770). If it is not a fingerprint of a registered user, the total system is controlled not to be operated (S760).

Fig. 9 is a flowchart illustrating a routine encoding/decoding a file according to the present invention. As shown in Fig. 9, it is decided whether a file desired to executed is a file enabled to be encoded/decoded (S800). If the file can not be encoded/decoded, a impossible message is output and a file relevant to a system is executed (S805).

If the file can be encoded/decoded, steps S810 to S865 are performed. Steps S810 to S865

are the same as steps S710 to S765 shown in Fig. 8 and will not be described in detail.

When a user's fingerprint is recognized and passed, an encoding/decoding operation of the file is performed (S870) and the total system is normally operated.

As stated above, the present invention provides an effect of using easily and safely a fingerprint recognizing function by including a fingerprint recognizing function into a display apparatus which is the most important interface equipment for an user in a computer environment.

In addition, the present invention has an effect resolving a problem caused by a conventional mouse including a fingerprint recognizing function since a fingerprint recognizing function is included into a display apparatus.

In addition, the present invention allows only an authorized user to enter a computer system by including a fingerprint recognizing function into a display apparatus so that a terminal securing function and an encoding/decoding function of important files are provided. Also, a securing function can be more intensified by providing a function dissolving a screen protection through an input of fingerprint and a function approving an transaction through a fingerprint in an electronic commerce system later.

Although the preferred embodiment of the present invention has been described, it will be understood by those skilled in the art that the present invention should not be limited to the described preferred embodiment, but various changes and modifications can be made within the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A fingerprint recognizing display system comprising:

a monitor having a screen and a front cover adjacent said screen;

a fingerprint recognizing module included with said monitor, said fingerprint recognizing module including a fingerprint image recognizing unit disposed on a surface of said front cover, wherein an user desiring access to said fingerprint recognizing display system touches said fingerprint image recognizing unit; and

a computer main body including a fingerprint data base and a fingerprint verifying unit, wherein said fingerprint verifying unit compares fingerprint data transmitted from said fingerprint recognizing module to registered fingerprint data stored in said fingerprint data base and permits said user access to programs stored in said fingerprint recognizing display system when it is determined that the fingerprint of said user matches fingerprint data stored in said fingerprint data base.

2. The fingerprint recognizing display system as set forth in claim 1, wherein said fingerprint image recognizing unit is integrally formed with a power switch disposed on the surface of said front cover.

3. The fingerprint recognizing display system as set forth in claim 1, wherein said fingerprint recognizing module also includes:

a converter converting analog fingerprint data input from the fingerprint image recognizing

unit to digital fingerprint data, and

a first communication unit transmitting the digital fingerprint data to a second communication unit in the computer main body.

4. The fingerprint recognizing display system as set forth in claim 1, wherein said monitor includes a microprocessor communicating with a video card in said computer main body.

5. The fingerprint recognizing display system as set forth in claim 4, wherein said fingerprint recognizing module also includes:

a converter converting analog fingerprint data input from the fingerprint image recognizing unit to digital fingerprint data, and

said microprocessor transmits the digital fingerprint data to a communication unit in the computer main body.

6. The fingerprint recognizing display system as set forth in claim 1, wherein said fingerprint verification unit includes:

a decoding unit for decoding the registered fingerprint data read from said fingerprint data base;

an encoding unit for encoding fingerprint data for storage into said fingerprint data base;

a distinctive feature detecting unit for detecting a distinctive feature of a fingerprint corresponding to the fingerprint data transmitted from said monitor;

a fingerprint matching/recording unit for receiving decoded fingerprint data from said decoding unit or providing fingerprint data to said encoding unit, said fingerprint matching/recording unit comparing decoded fingerprint data received from said decoding unit to said distinctive feature received from said distinctive feature detecting unit or outputting said distinctive feature received from said distinctive feature detecting unit to said encoding unit to be stored as the registered fingerprint data in said fingerprint data base; and

a recognizing unit outputting a "pass" signal or a "fail" signal in response to a comparison result output from said fingerprint matching/recording unit.

7. The fingerprint recognizing display system as set forth in claim 3, wherein said fingerprint verification unit includes:

a decoding unit for decoding the registered fingerprint data read from said fingerprint data base;

an encoding unit for encoding fingerprint data for storage into said fingerprint data base;

a distinctive feature detecting unit for detecting a distinctive feature of a fingerprint corresponding to the fingerprint data transmitted from said first communication unit to said second communication unit;

a fingerprint matching/recording unit for receiving decoded fingerprint data from said decoding unit or providing fingerprint data to said encoding unit, said fingerprint matching/recording unit comparing decoded fingerprint data received from said decoding unit to said distinctive feature received from said distinctive feature detecting unit or outputting said distinctive feature received

from said distinctive feature detecting unit to said encoding unit to be stored as the registered fingerprint data in said fingerprint data base; and

a recognizing unit outputting a "pass" signal or a "fail" signal in response to a comparison result output from said fingerprint matching/recording unit.

8. The fingerprint recognizing display system as set forth in claim 5, wherein said fingerprint verification unit includes:

a decoding unit for decoding the registered fingerprint data read from said fingerprint data base;

an encoding unit for encoding fingerprint data for storage into said fingerprint data base;

a distinctive feature detecting unit for detecting a distinctive feature of a fingerprint corresponding to the fingerprint data transmitted from said microprocessor to said communication unit;

a fingerprint matching/recording unit for receiving decoded fingerprint data from said decoding unit or providing fingerprint data to said encoding unit, said fingerprint matching/recording unit comparing decoded fingerprint data received from said decoding unit to said distinctive feature received from said distinctive feature detecting unit or outputting said distinctive feature received from said distinctive feature detecting unit to said encoding unit to be stored as the registered fingerprint data in said fingerprint data base; and

a recognizing unit outputting a "pass" signal or a "fail" signal in response to a comparison result output from said fingerprint matching/recording unit.

9. The fingerprint recognizing display system as set forth in claim 1, wherein said monitor comprises a cathode ray tube display apparatus or a liquid crystal display apparatus.

10. A display apparatus comprising:

a front cover; and

fingerprint recognizing means located on a front or side panel of the front cover.

11. A display apparatus comprising:

a front cover;

a power switch placed on a predetermined portion of said front cover; and

fingerprint recognizing means formed integrally with the power switch to read a fingerprint image of an user.

12. A method of recognizing a fingerprint to enable an user to operate a computer system, said method being embodied in an operating system kernel mode and comprising the steps of:

detecting a fingerprint of the user when said user touches a portion of a front cover of a monitor of said computer system;

transmitting fingerprint data corresponding to said fingerprint of said user, when detected, from said monitor to a computer main body of said computer system;

comparing the fingerprint data transmitted from said monitor to registered fingerprint data output from a fingerprint data base included in said computer main body; and

enabling said computer system to be operated by said user when said comparing step indicates that there is a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base, or disabling said computer system to prevent operation by said user when said comparing step indicates that there is not a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base.

13. The method as set forth in claim 12, further comprising steps of:

determining whether said monitor is a fingerprint recognizing monitor; and

determining that said monitor is operating in an abnormal status and preventing said computer system from being operated when it is determined that said monitor is not a fingerprint recognizing monitor, or performing said step of detecting a fingerprint when it is determined that said monitor is a fingerprint recognizing monitor.

14. The method as set forth in claim 13, further comprising steps of:

determining whether said fingerprint data base has been established in said computer main body prior to determining whether said monitor is a fingerprint recognizing monitor; and

recognizing that said computer system has been activated and performing fingerprint registration routine when it is determined that said fingerprint data base has not been established, or

performing said step of determining whether said monitor is a fingerprint recognizing monitor when it is determined that said fingerprint data base has been established.

15. The method as set forth in claim 13, further comprising steps of:

determining whether a keyboard or a mouse of said computer system is operated by said user during operation of a screen protection routine of said computer system; and

continuing to run a screen saver program when it is determined that neither said keyboard nor said mouse have been operated, or performing said step of determining whether said monitor is a fingerprint recognizing monitor when it is determined that one of said keyboard or said mouse have been operated.

16. The method as set forth in claim 15, further comprising a step of ending said screen protection routine when said comparing step indicates that there is a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base, and then performing said step of enabling said computer system to be operated by said user.

17. The method as set forth in claim 12, wherein said comparing step includes steps of:

checking said fingerprint data transmitted from said monitor and detecting distinctive features thereof;

determining whether the detected distinctive features are of good quality; and

outputting an error message when it is determined that the detected distinctive features are not of good quality and returning to said step of detecting a fingerprint of the user, or performing said comparing step when it is determined that the detected distinctive features are of good quality.

18. The method as set forth in claim 13, further comprising steps of:

determining whether a file stored in said computer system is enable to be encoded or decoded during operation of a file encoding/decoding routine of said computer system;

outputting an message indicating said file can not be encoded or decoded when it is determined said file is not enable to be encoded or decoded, or performing said step of determining whether said monitor is a fingerprint recognizing monitor when it is determined that one of said keyboard or said mouse have been operated; and

permitting said user to encode or decode said file when said comparing step indicates that there is a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base.

19. The method as set forth in claim 14, wherein said fingerprint registration routine comprises the steps of:

detecting a fingerprint of a manager when said manager touches the portion of the front cover of said monitor of said computer system;

transmitting fingerprint data corresponding to said fingerprint of said manager, when detected, from said monitor to said computer main body of said computer system;

comparing the fingerprint data transmitted from said monitor to registered fingerprint data output from a fingerprint data base included in said computer main body; and

permitting said manager to operate a fingerprint managing and registering program when said comparing step indicates that there is a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base, or disabling said computer system to prevent operation by said manager when said comparing step indicates that there is not a match between the fingerprint data transmitted from said monitor and the registered fingerprint data output from said fingerprint data base.

ABSTRACT OF THE DISCLOSURE

A fingerprint recognizing display system including fingerprint recognizing means in a panel of a display apparatus and an operating method thereof, wherein a fingerprint of an user is read and a program supported by a computer is allowed to be operated only if the read fingerprint is registered in fingerprint data of the computer. A display apparatus recognizes a fingerprint of the user through a fingerprint recognizing module included in the display apparatus and outputs recognized fingerprint data by using a communication device included in the fingerprint recognizing module. A computer main body includes a fingerprint data base having data of more than one fingerprint and a fingerprint verifying unit, and operates a program after deciding whether fingerprint data input from the display apparatus is an approved fingerprint through the fingerprint data base and the fingerprint verifying unit.

FIG.1

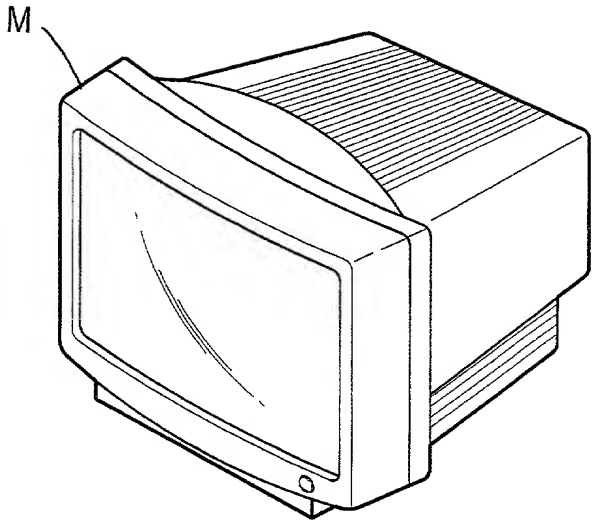


FIG.2

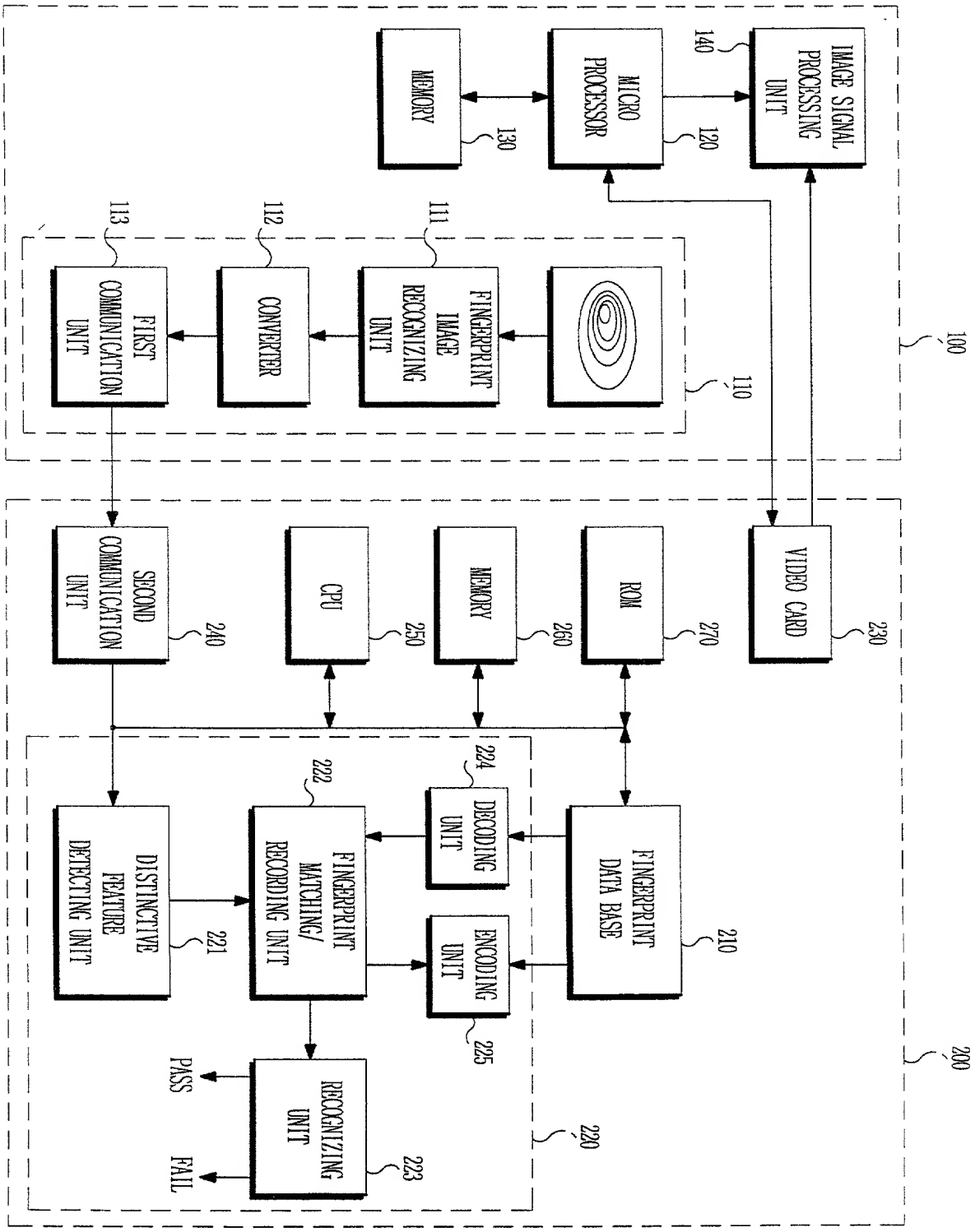

100
IMAGE SIGNAL PROCESSING UNIT
140
MICRO PROCESSOR
120
MEMORY
130
110
FINGERPRINT IMAGE RECOGNIZING UNIT
111
CONVERTER
112
FIRST COMMUNICATION UNIT
113
200
VIDEO CARD
230
ROM
270
MEMORY
260
CPU
250
SECOND COMMUNICATION UNIT
240
220
FINGERPRINT DATA BASE
210
ENCODING UNIT
225
DECODING UNIT
224
FINGERPRINT MATCHING/ RECORDING UNIT
222
DISTINCTIVE FEATURE DETECTING UNIT
221
RECOGNIZING UNIT
223
PASS
FAIL

FIG.3

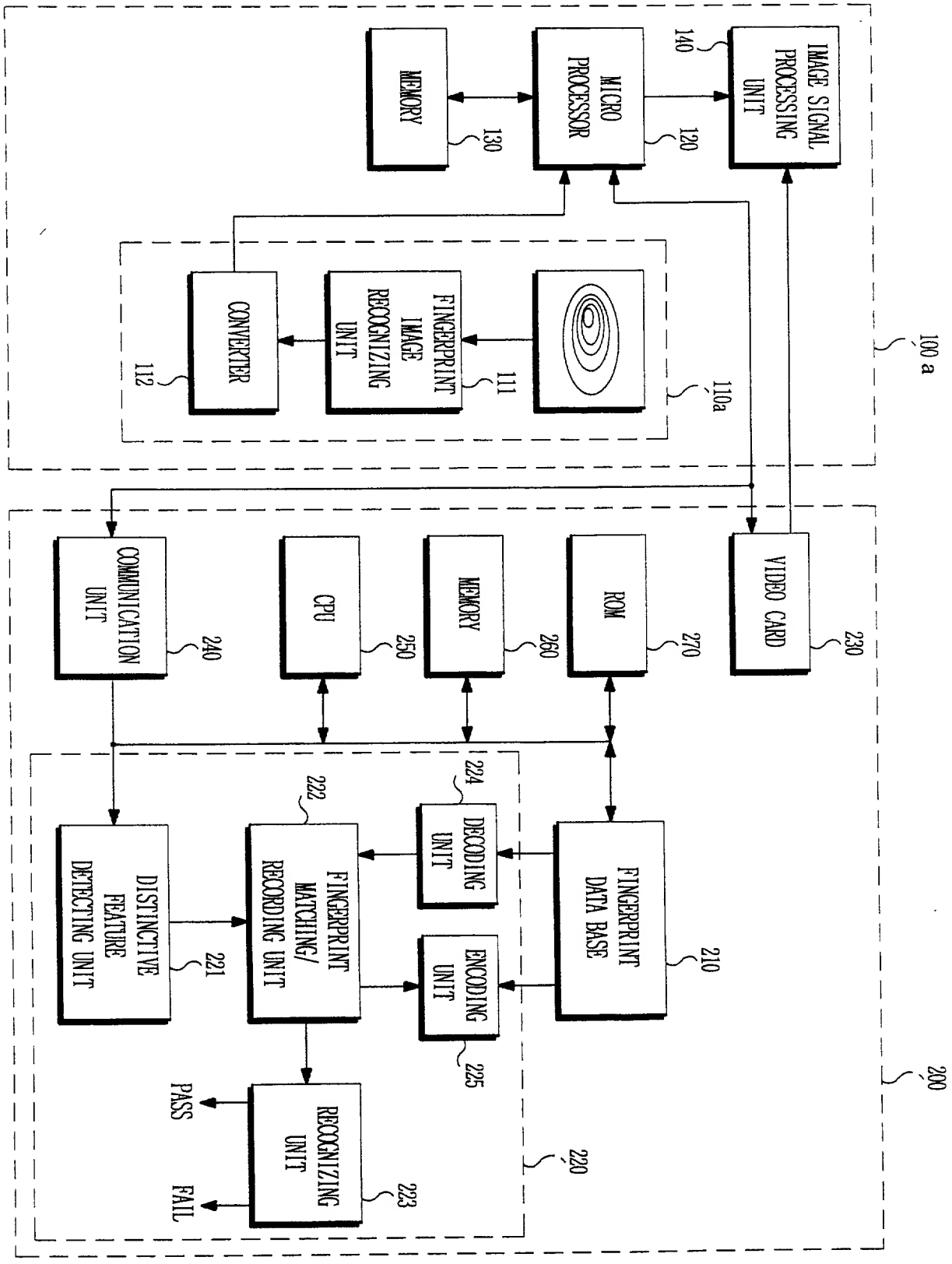


FIG.4

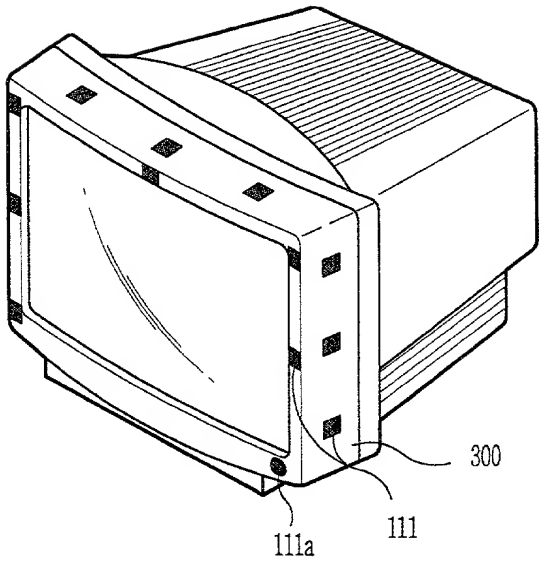


FIG.5

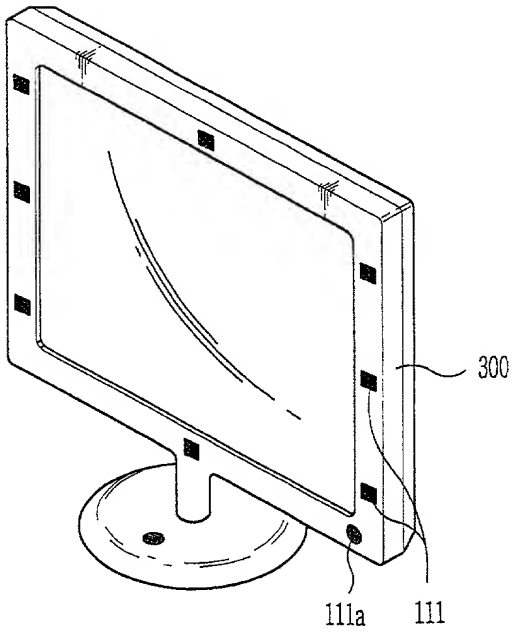


FIG.6

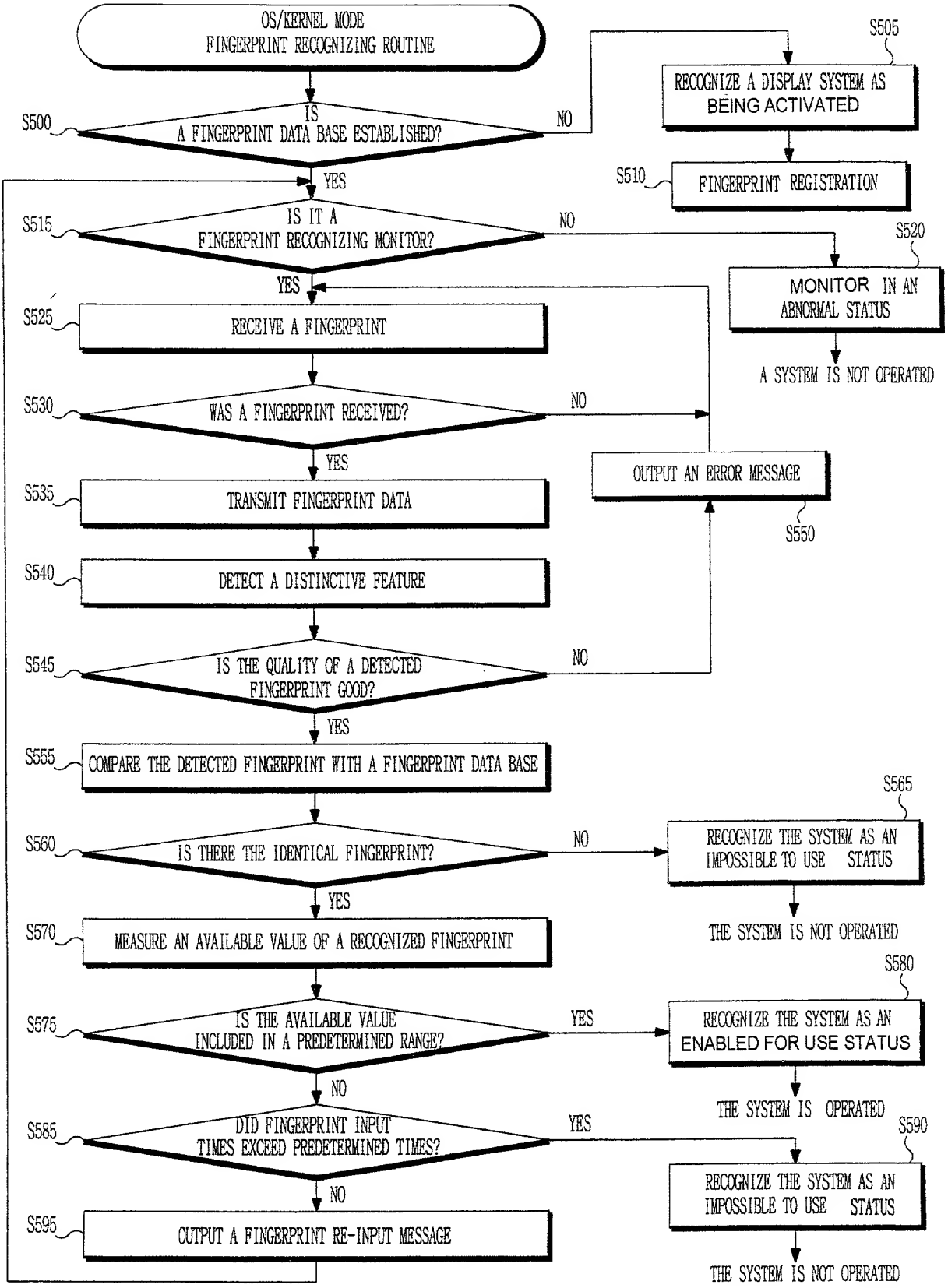

OS/KERNEL MODE
FINGERPRINT RECOGNIZING ROUTINE
S500
IS
A FINGERPRINT DATA BASE ESTABLISHED?
NO
YES
S505
RECOGNIZE A DISPLAY SYSTEM AS
BEING ACTIVATED
S510
FINGERPRINT REGISTRATION
S515
IS IT A
FINGERPRINT RECOGNIZING MONITOR?
NO
YES
S520
MONITOR IN AN
ABNORMAL STATUS
A SYSTEM IS NOT OPERATED
S525
RECEIVE A FINGERPRINT
S530
WAS A FINGERPRINT RECEIVED?
NO
YES
OUTPUT AN ERROR MESSAGE
S550
S535
TRANSMIT FINGERPRINT DATA
S540
DETECT A DISTINCTIVE FEATURE
S545
IS THE QUALITY OF A DETECTED
FINGERPRINT GOOD?
NO
YES
S555
COMPARE THE DETECTED FINGERPRINT WITH A FINGERPRINT DATA BASE
S560
IS THERE THE IDENTICAL FINGERPRINT?
NO
YES
S565
RECOGNIZE THE SYSTEM AS AN
IMPOSSIBLE TO USE STATUS
THE SYSTEM IS NOT OPERATED
S570
MEASURE AN AVAILABLE VALUE OF A RECOGNIZED FINGERPRINT
S575
IS THE AVAILABLE VALUE
INCLUDED IN A PREDETERMINED RANGE?
YES
NO
S580
RECOGNIZE THE SYSTEM AS AN
ENABLED FOR USE STATUS
THE SYSTEM IS OPERATED
S585
DID FINGERPRINT INPUT
TIMES EXCEED PREDETERMINED TIMES?
YES
NO
S590
RECOGNIZE THE SYSTEM AS AN
IMPOSSIBLE TO USE STATUS
THE SYSTEM IS NOT OPERATED
S595
OUTPUT A FINGERPRINT RE-INPUT MESSAGE

FIG.7

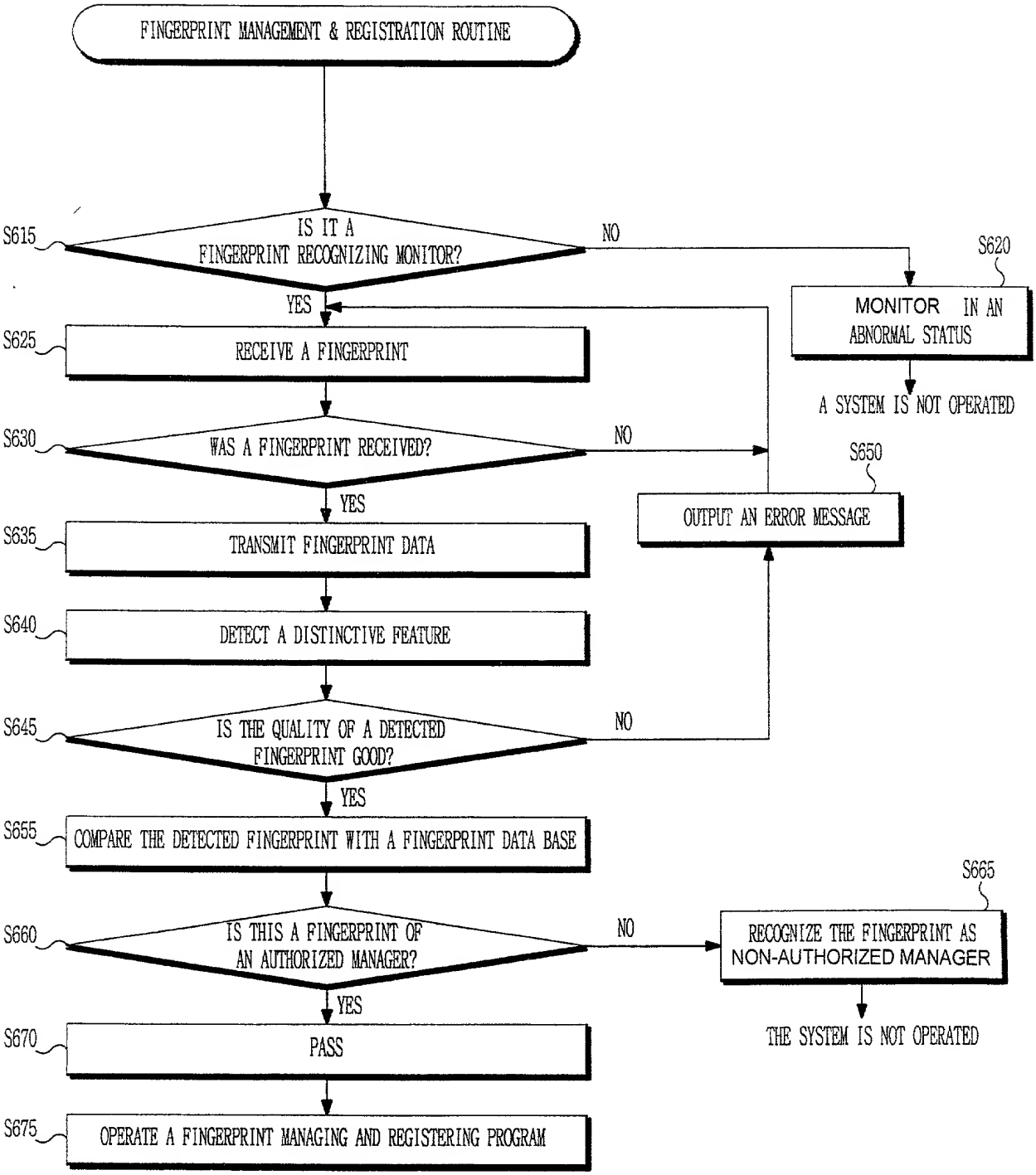

FINGERPRINT MANAGEMENT & REGISTRATION ROUTINE
S615
IS IT A FINGERPRINT RECOGNIZING MONITOR?
NO
S620
MONITOR IN AN ABNORMAL STATUS
A SYSTEM IS NOT OPERATED
YES
S625
RECEIVE A FINGERPRINT
S630
WAS A FINGERPRINT RECEIVED?
NO
S650
OUTPUT AN ERROR MESSAGE
YES
S635
TRANSMIT FINGERPRINT DATA
S640
DETECT A DISTINCTIVE FEATURE
S645
IS THE QUALITY OF A DETECTED FINGERPRINT GOOD?
NO
YES
S655
COMPARE THE DETECTED FINGERPRINT WITH A FINGERPRINT DATA BASE
S665
S660
IS THIS A FINGERPRINT OF AN AUTHORIZED MANAGER?
NO
RECOGNIZE THE FINGERPRINT AS NON-AUTHORIZED MANAGER
THE SYSTEM IS NOT OPERATED
YES
S670
PASS
S675
OPERATE A FINGERPRINT MANAGING AND REGISTERING PROGRAM

FIG.8

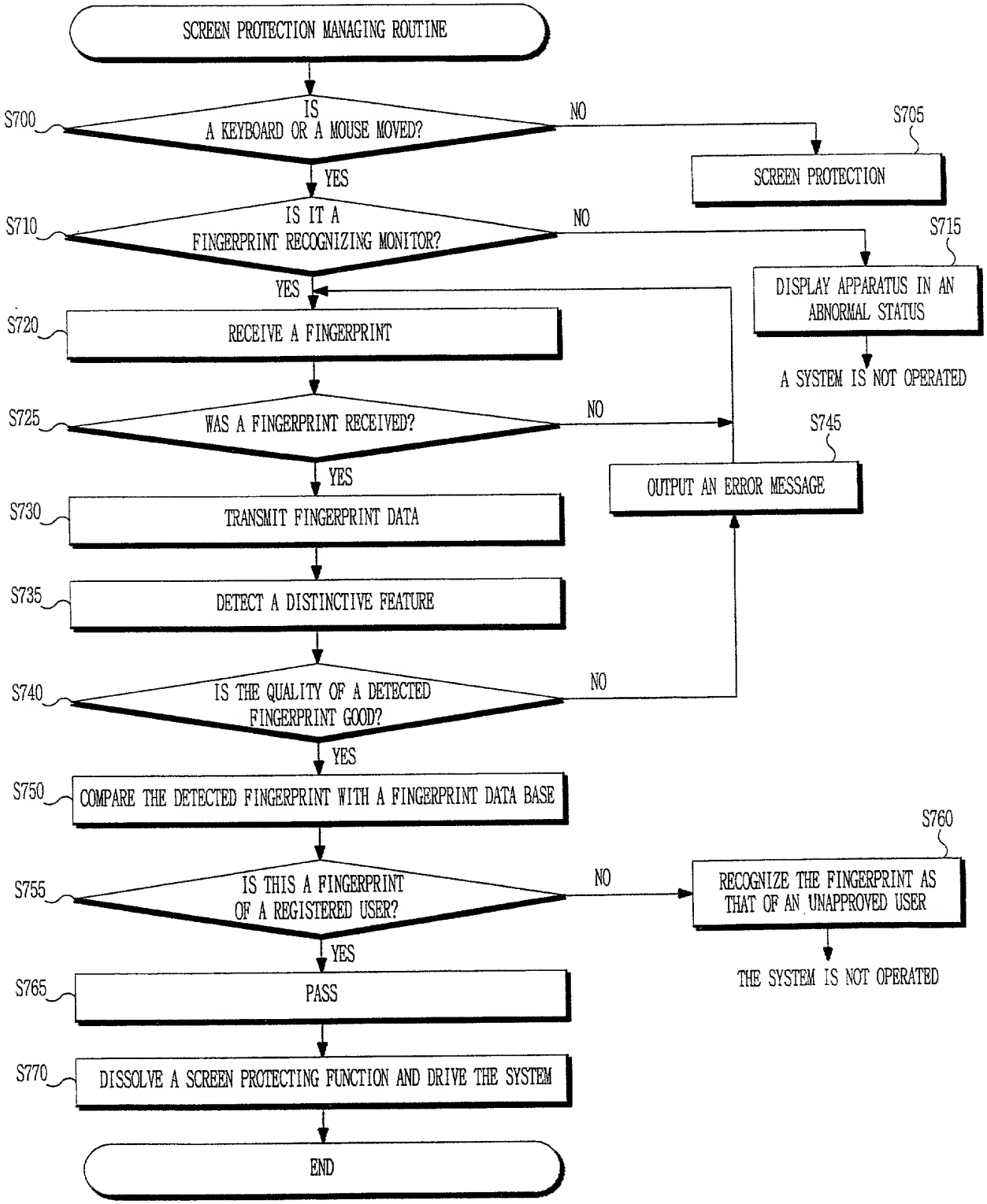
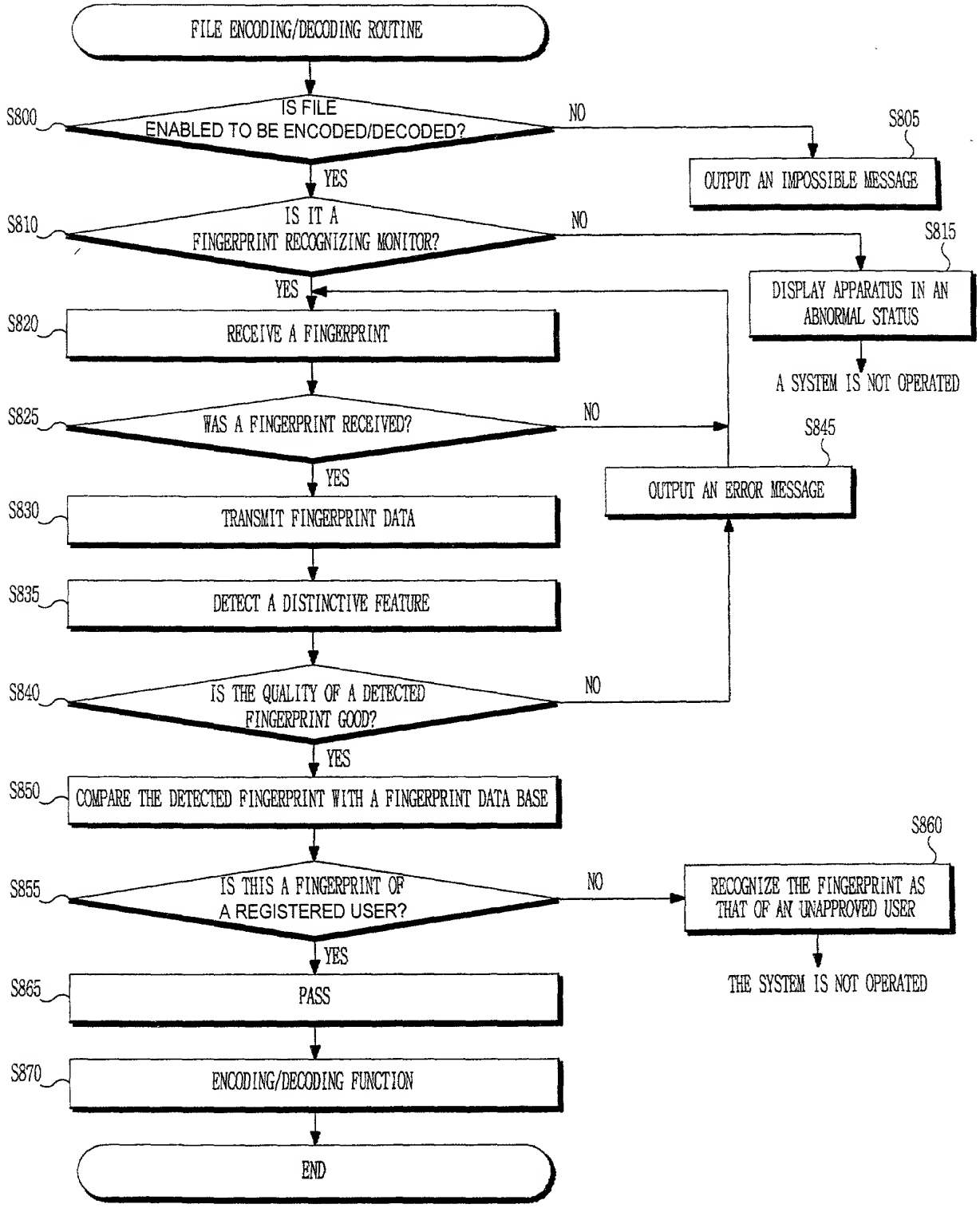

SCREEN PROTECTION MANAGING ROUTINE
S700
IS A KEYBOARD OR A MOUSE MOVED?
NO
S705
SCREEN PROTECTION
YES
S710
IS IT A FINGERPRINT RECOGNIZING MONITOR?
NO
S715
DISPLAY APPARATUS IN AN ABNORMAL STATUS
A SYSTEM IS NOT OPERATED
YES
S720
RECEIVE A FINGERPRINT
S725
WAS A FINGERPRINT RECEIVED?
NO
S745
OUTPUT AN ERROR MESSAGE
YES
S730
TRANSMIT FINGERPRINT DATA
S735
DETECT A DISTINCTIVE FEATURE
S740
IS THE QUALITY OF A DETECTED FINGERPRINT GOOD?
NO
YES
S750
COMPARE THE DETECTED FINGERPRINT WITH A FINGERPRINT DATA BASE
S760
S755
IS THIS A FINGERPRINT OF A REGISTERED USER?
NO
RECOGNIZE THE FINGERPRINT AS THAT OF AN UNAPPROVED USER
THE SYSTEM IS NOT OPERATED
YES
S765
PASS
S770
DISSOLVE A SCREEN PROTECTING FUNCTION AND DRIVE THE SYSTEM
END

FIG.9


FILE ENCODING/DECODING ROUTINE
S800
IS FILE ENABLED TO BE ENCODED/DECODED?
NO
S805
OUTPUT AN IMPOSSIBLE MESSAGE
YES
S810
IS IT A FINGERPRINT RECOGNIZING MONITOR?
NO
S815
DISPLAY APPARATUS IN AN ABNORMAL STATUS
A SYSTEM IS NOT OPERATED
YES
S820
RECEIVE A FINGERPRINT
S825
WAS A FINGERPRINT RECEIVED?
NO
S845
OUTPUT AN ERROR MESSAGE
YES
S830
TRANSMIT FINGERPRINT DATA
S835
DETECT A DISTINCTIVE FEATURE
S840
IS THE QUALITY OF A DETECTED FINGERPRINT GOOD?
NO
YES
S850
COMPARE THE DETECTED FINGERPRINT WITH A FINGERPRINT DATA BASE
S860
S855
IS THIS A FINGERPRINT OF A REGISTERED USER?
NO
RECOGNIZE THE FINGERPRINT AS THAT OF AN UNAPPROVED USER
THE SYSTEM IS NOT OPERATED
YES
S865
PASS
S870
ENCODING/DECODING FUNCTION
END

PATENT
P56173

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

YOUNG-HUN CHOI *et al.*

Serial No.:	*To Be Assigned*	Examiner:	*To Be Assigned*
Filed:	28 September 2000	Art Unit:	*To Be Assigned*

For: FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF

TRANSMITTAL OF DECLARATION

The Assistant Commissioner
of Patents
Washington, D.C. 20231

Sir:

Accompanying this transmittal is a Declaration for the above-referenced application.

Respectfully submitted,

Robert E. Bushnell
Reg. No.: 27,774
Attorney for the Applicant

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Folio: P56173
Date: 9/28/00
I.D.: REB/sys

PTO/SB/01 (6/95)

DECLARATION

Docket No. P56173

AS A BELOW NAMED INVENTOR, I hereby declare that:
My residence, post office address and citizenship are as stated next to my name.
I believe that I am the original, first and sole (*if only one name is listed below*), or an original, first and joint inventor (*if plural names are listed below*), of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE: FINGERPRINT RECOGNIZING DISPLAY AND OPERATING METHOD THEREOF

the specification of which either is attached hereto or otherwise accompanies this Declaration, or:

☐ was filed in the U.S. Patent & Trademark Office on _____ and assigned Serial No. _____

☐ and (*if applicable*) was amended on _____

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability and to the examination of this application in accordance with Title 37 of the Code of Federal Regulations §1.56. I hereby claim foreign priority benefits under Title 35, U.S. Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States, or §119(e) of any United States provisional application(s), listed below and have also identified below any foreign applications for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

(Application Number)	(Country)	(Day/Month/Year filed)	Priority Claimed:
P1999-49230	Republic of Korea	8 November 1999	Yes [X] No [ ]
			Yes [ ] No [ ]
			Yes [ ] No [ ]

☐ I hereby claim the benefit under Title 35, U.S. Code, §120, of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, U.S. Code, §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, The Code of Federal Regulations, §1.56(a) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(STATUS: patented, pending, abandoned)

☐ I hereby revoke all previously granted powers of attorney and appoint the following attorneys: Robert E. Bushnell, Reg. No. 27,774, Michael D. Parker, Reg. No. 34,973, and Henry M. Zykorie, Reg. No. 27,477, to prosecute this application and to transact all business in the U.S. Patent & Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application, with full power of appointment and with full power to substitute an associate attorney or agent, and to receive all patents which may issue thereon, and request that all correspondence be addressed to:

Robert E. Bushnell,
Attorney-at-Law
Suite 300, 1522 "K" Street, N.W.
Washington, D.C. 20005-1202

Payor No. 008439
Area Code: 202-638-5740

I HEREBY DECLARE that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 U.S. Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Republic of Korea

FULL NAME OF THIRD JOINT INVENTOR: _____ — Citizenship: _____
Inventor's signature: _____ — Date: _____
Residence & Post Office Address:

FULL NAME OF FOURTH JOINT INVENTOR: _____ — Citizenship: _____
Inventor's signature: _____ — Date: _____
Residence & Post Office Address:

☐ Additional inventors are being named on separately numbered sheets attached hereto.